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10/550,704	07/13/2006	James Martin	14 0237-PCT-US	3099
28116	7590	05/19/2009		
WesternGeco L.L.C.				
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EXAMINER				
SAITO, KRYSTINE E				
ART UNIT		PAPER NUMBER		
3663				
NOTIFICATION DATE		DELIVERY MODE		
05/19/2009		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/550,704

Applicant(s)

MARTIN ET AL.

Examiner

Krystine Saito

Art Unit

3663

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 10, 12-16 and 20-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 10, 12-16 and 20-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's amendments filed 10/23/2008 have been entered. Claims 2-9, 11, and 17-19 have been cancelled. Applicant's arguments with respect to claims 1, 10, 12-16, and 20-28 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 20, 21, 23, 24, 26, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ray (4353121) in view of Berni (4520467).

4. Ray discloses applying a gain recover to the seismic data (Col 4, line 66; Fig 15: 62); applying a normal moveout correction to the seismic data (Col 5, lines2-3; Fig 15: 70); muting the seismic data (Fig 15: 72); stacking the seismic data (Col 5, lines 3-4; Fig 15: 74); and applying a time migration to the seismic data (Fig 15: 100); applying a demultiple algorithm to remove events that involve multiple passes through a water column in which a receiver used to acquire the seismic data is disposed (Col 5, lines 8-9); applying a post-stack deconvolution algorithm to whiten a signal spectrum (Fig 15: 100).

5. However, Ray does not disclose acquiring, or retrieving from storage, seismic data representative of an acceleration wavefield; removing an effect of a signature of the source used to acquire the seismic data; applying a trace equalization algorithm to the seismic data; equalizing amplitudes of the stacked seismic data; combining seismic data with pressure data; a seismic source for emitting seismic energy; and a seismic receiver for acquiring seismic data representative of the acceleration wavefield.

6. Berni teaches acquiring, or retrieving from storage, seismic data representative of an acceleration wavefield (Col 4, lines 4-32); removing an effect of a signature of the source used to acquire the seismic data (Col 5, lines 51-53); applying a trace equalization algorithm to the seismic data (Col 4, lines 62-68; Col 5, lines 1-2); equalizing amplitudes of the stacked seismic data (Col 2, lines 15-19, 24-29); combining seismic data with pressure data (Col 2, lines 1-68); a seismic source for emitting seismic energy (Col 3, lines 58-59); and a seismic receiver for acquiring seismic data representative of the acceleration wavefield (Col 4, lines 9-11, 14-17).

7. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Ray with the steps of Berni since such a modification would have further removed noise from the seismic trace and provided a better image of the subsurface.

8. Claims 10, and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ray in view of Berni, and further in view of Amundsen (2005/0090987).

9. Ray as modified teaches the invention as discussed above. However it does not teach an input interface for receiving seismic data representative of acceleration

wavefield; a data processor; and memory comprising program instructions executable by the processor; the seismic source and the receiver are each disposed at or on the earth's surface; the seismic source is disposed at or on the earth's surface and the receiver is disposed within a borehole; and the seismic source is disposed in a water column and the receiver is located at the base of the water column.

10. Amundsen teaches an input interface for receiving seismic data representative of acceleration wavefield (Fig 12: 20); a data processor (Fig 12: 16); and memory comprising program instructions executable by the processor (Fig 12: 17); the seismic source and the receiver are each disposed at or on the earth's surface ([0003], lines 1-4); the seismic source is disposed at or on the earth's surface and the receiver is disposed within a borehole ([0004], lines 14-16); and the seismic source is disposed in a water column and the receiver is located at the base of the water column ([0004], lines 6-9).

11. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Ray as modified to use the system of Amundsen since such a modification would have allowed it to be used in a wider variety of applications.

12. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ray in view of Berni and Amundsen, and further in view of Quinn (2004/0109389).

13. Ray as modified teaches the invention as discussed above. However it does not teach the seismic source is disposed in a water column and the receiver is disposed within a borehole.

14. Quinn teaches the seismic source is disposed in a water column and the receiver is disposed within a borehole ([0004], lines 2-3, 9-10).

15. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Ray as modified to use the system of Quinn since such a modification would have allowed it to be used in a wider variety of applications.

16. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ray in view of Berni, and further in view of Barr (4979150).

17. Ray as modified teaches the invention as discussed above. However, it does not teach removing coherent noise from the seismic data.

18. Barr teaches removing coherent noise from the seismic data (Col 2, line 36). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Ray as modified with the step of Barr since such a modification would have led to clearer and more useful data.

19. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ray in view of Berni, and further in view of Schifflett (5642327).

20. Ray as modified teaches the invention as discussed above. However, it does not teach applying a pre-stack deconvolution algorithm.

21. Schifflett teaches applying a pre-stack deconvolution algorithm (Col 9, line 6). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Ray to include the step of Schifflett since such a modification would have led to noise reduced data for further processing.

22. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ray in view of Berni, and further in view of Kamas (2004/0070529).
23. Ray as modified teaches the invention as discussed above. However, it does not teach applying a time-varying bandpass filter to the seismic data.
24. Kamas teaches applying a time-varying bandpass filter to the seismic data ([0026], lines 6-8). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Ray to include the step of Kamas, since such a modification would have reduced the amount of computation necessary by providing only data in a useful frequency range.

Conclusion

The prior art which is cited but not relied upon is considered pertinent to applicant's disclosure: 6651007, 7164619, 2004/0049349, 4979150.

The references made herein are done so for the convenience of the applicant. They are in no way intended to be limiting. The prior art should be considered in its entirety.

25. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krystine Saito whose telephone number is (571)270-7614. The examiner can normally be reached on Monday thru Thursday, 8am-5:30pm EST and alternate Fridays 8am-4:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571)272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. S./

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Art Unit: 3663

Examiner, Art Unit 3663

/Jack W. Keith/

Supervisory Patent Examiner, Art Unit 3663